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A View of Ankara, 18th century, Rijksmuseum A2055, Amsterdam. See Gary Leiser, Travellers' Accounts of Mohair Production in Ankara from the Fifteenth through the Nineteenth Century, pp. 5-34.

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Note to contributors

The Textile Museum Journal is devoted to the presentation of scholarship concerning the cultural, technical, historical, and aesthetic significance of textiles. The *Journal* is international in scope with emphasis on geographic areas represented in The Textile Museum collections, which are drawn primarily from Near Eastern, Asian, African, and indigenous American cultures.

Authors are invited to submit manuscripts based on original research of a documentary, analytical, or interpretive nature. Acceptance of manuscripts for publication is based upon peer review. Articles should be both scholarly and accessible to a broad readership.

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The Textile Museum

The Textile Museum is dedicated to furthering the understanding of mankind's creative achievements in the textile arts. As a museum, it is committed to its role as a center of excellence in the scholarly research, conservation, interpretation, and exhibition of textiles, with particular concern for the artistic, technical, and cultural significance of its collections. This mission is pursued through development and maintenance of collections, records, and a library, as well as through scholarly research, exhibitions, publications, and educational programs.

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Travellers' Accounts of Mohair Production in Ankara from the Fifteenth through the Nineteenth Century

Gary Leiser

Dedicated to the Memory of
Schuyler V.R. Cammann

"You i' the camlet, get up o' the rail"
Henry VIII, Act V, Scene 4, Line 93

The origin and history of many important textiles that were produced before the modern era are often difficult to trace because of a lack of written documentation. When written records are available, they usually shed light on the economic significance of a textile rather than on where or how it was made. One type of textile for which we are fortunate to have a number of written sources, and even a visual portrayal, concerning both its economic importance and its technological development over many centuries is cloth made from mohair, the hair of the Angora goat.¹

Based on research in the Ankara religious court archives (*şer'i mahkeme defterleri* or *kadi sicilleri*), two Turkish scholars have recently published work on the significance of mohair to the economic

prosperity of Ankara, long the center of its production, in the sixteenth and seventeenth centuries. The data in these archives primarily concern fiscal or legal matters.² For technology we can turn to the reports of travellers, mostly Europeans, who visited Ankara between the fifteenth and twentieth centuries. From their varied descriptions of the economic life of the city, we can extract a unique and generally neglected account of mohair. These descriptions are sometimes quite detailed. Together they provide a rich source for our understanding of the technology and the history of mohair cloth in Ankara over a four hundred-year period. They offer a wealth of information about the Angora goat and its products; methods of "shearing" and spinning; processes of weaving, watering, pressing, and dyeing; types and qualities of mohair cloth; the history of the industry and trade.

Origin of the Angora Goat

There was no mohair, of course, without the Angora goat. There are several theories about the origin of this special animal.³ One theory simply maintains that the Angora goat was a species indigenous to central Anatolia.⁴ Another holds that this goat originated in Central Asia and was brought from there to the region of Ankara by nomadic Turkish tribes in the Seljuk period, that is, the twelfth or thirteenth century.⁵ Finally, it has been suggested that this goat appeared over time from mutations in ordinary flocks of goats and that it was purposely bred by the Ottomans, beginning in the fifteenth century.⁶

The reason there are so many theories is that the evidence—zoological, archeological, and historical—for the presence of the Angora goat, and textiles made from its hair, in central Anatolia before the fourteenth century A.D. is inconclusive.

Complete skeletons of goats, or any other domesticated animals, dating from prehistoric, ancient, or even medieval times have rarely survived in Anatolia. Furthermore, most bones of a goat resemble those of a sheep. More important, the only way the skeletons of different species of goats can be distinguished is by their horns, which are either straight or curled.

La Florida's Mortuary Textiles: The Oldest Extant Textiles From Ecuador

Suzette J. Doyon-Bernard

The textile remains recovered from the tombs of La Florida near Quito provide a rare opportunity to assess the weaving tradition of pre-Hispanic Ecuador. Radiocarbon dated to around A.D. 340 (uncalibrated),¹ the collection is comprised of nearly 250 fragments and lengths of cordage, and represents the oldest extant textiles known to have survived the moist climate of this Andean nation. The only other Ecuadorian textile assemblage of comparable size is that from Hacienda La Compañía in coastal Los Ríos Province, where a cache of some 80 fragments was found encased within a single burial urn (Gardner 1985, pp. 328, 330). The late pre-Hispanic context of La Compañía would indicate that its textiles were interred a millennium or so later than those from La Florida. Apart from these two collections, the recovery of preserved fibers is so exceptional in Ecuadorian archaeology that relatively few site reports even mention their presence.²

In the absence of extant fibers, researchers have been able to glean valuable information regarding the early textile industry in Ecuador through a study of textile impressions, which have been found occasionally on baked-clay surfaces. These impressions were formed when textiles were pressed—accidentally or intentionally—into a wet clay surface prior to

firing the clay. The oldest of these textile imprints, two different plain-weave structures, were found by Jorge Marcos on a single lump of poorly-fired clay that he collected from the surface middens of a village near the Guayas coast (1979). The lump of clay was associated with late Valdivia style artifacts; radiocarbon measurements for other material from this context ranged from 1955 to 2250 B.C., uncalibrated (Marcos 1979, pp. 23, 25). Since the Marcos report, more systematic studies of later textile impressions have been conducted by Stothert and Epstein (n.d.) and by Stothert, Epstein, Cummins, and Freire (1991). The sherds used in these two studies were fragments of ceramic vessels and figurines produced along the Ecuadorian coast over a period of nearly two thousand years.

While specific parallels to the coastal tradition are evident, the general profile of Ecuador's oldest extant textile collection reveals a stronger affinity with a group of mortuary cloths recovered from the cemeteries just north of the Ecuadorian border in the highland department of Nariño, Colombia (Cardale de Schrimpf 1979). The similarities between these two collections of mortuary fabric are consistent with a broader pattern of shared cultural features, a pattern which has been identified in the ceramics and other diagnostic traits common to the two adjacent regions (see Doyon ms.). Even the survival rate of the Nariño and La Florida textiles seems attributable to a similar set of conditions: the unusual depth of the shaft tombs and the high number of copper artifacts present.

Discovery and Condition of La Florida's Textiles

Ecuador's oldest extant textiles were recovered from four of the six shaft tombs that were excavated by Leon Doyon from 1985 to 1987 at La Florida, a site perched on the slopes of the volcano Rucu Pichincha overlooking the Valley of Quito. Each tomb proved to be roughly bottle-shaped with a total depth of 12.5 to 15.1 meters below the original entrance (Doyon ms., p. 1). The anaerobic environment towards the bottom of each tomb should



have favored the preservation of organic materials, yet only a small fraction of the original burial garments and wrappings survived, probably due to the moist conditions within the tombs. The humidity near the bottom of the shafts, approximating 100%, hastened the decomposition of fiber products despite the depth of the tombs. Consequently, only small scraps of damp cloth and cordage were removed from La Florida's tombs, and most of these were heavily impregnated with soil and measured less than two to three centimeters in any direction.

Doyon determined that each shaft tomb contained the remains of between two and four high-status individuals. With one exception, all the high-status burials were accompanied by sacrificial burials, which numbered as many as nineteen individuals in one tomb (Doyon ms., p. 1; 1988, pp. 64–65). A subsequent analysis of the skeletal remains (Ubelaker ms.)

confirmed Doyon's suspicion that both males and females were represented among the high-status and the sacrificial burials. A reconstruction of tomb P-3 for a museum exhibition in Quito demonstrates the typical disposition of a La Florida tomb (fig. 1). This particular example included two high-status burials whose corpses were heavily wrapped to form burial bundles, and the bodies of at least six sacrificial burials (Doyon, personal communication 1989).

The high-status burials were readily distinguishable from the sacrificial ones by the quantity of associated elite goods, such as gilded copper ornaments, some fabricated into disks. In the richest tomb (C-2), gilded copper plates probably covered the entire surface of a truly resplendent garment or shroud. These plates, roughly the size of small postage stamps, were pierced twice along the median line for attachment with cotton cordage (fig. 2). The cordage

Fig. 1. A reconstruction of the base of shaft tomb P-3 with mummy bundles and mortuary offerings. Designed and built by Leon Doyon and Megan Criley for the exhibition, "Quito, antes de Benalcázar," held at the Centro Cultural Artes, Quito, from December 1988 to March 1989. Photo by David Bernard.

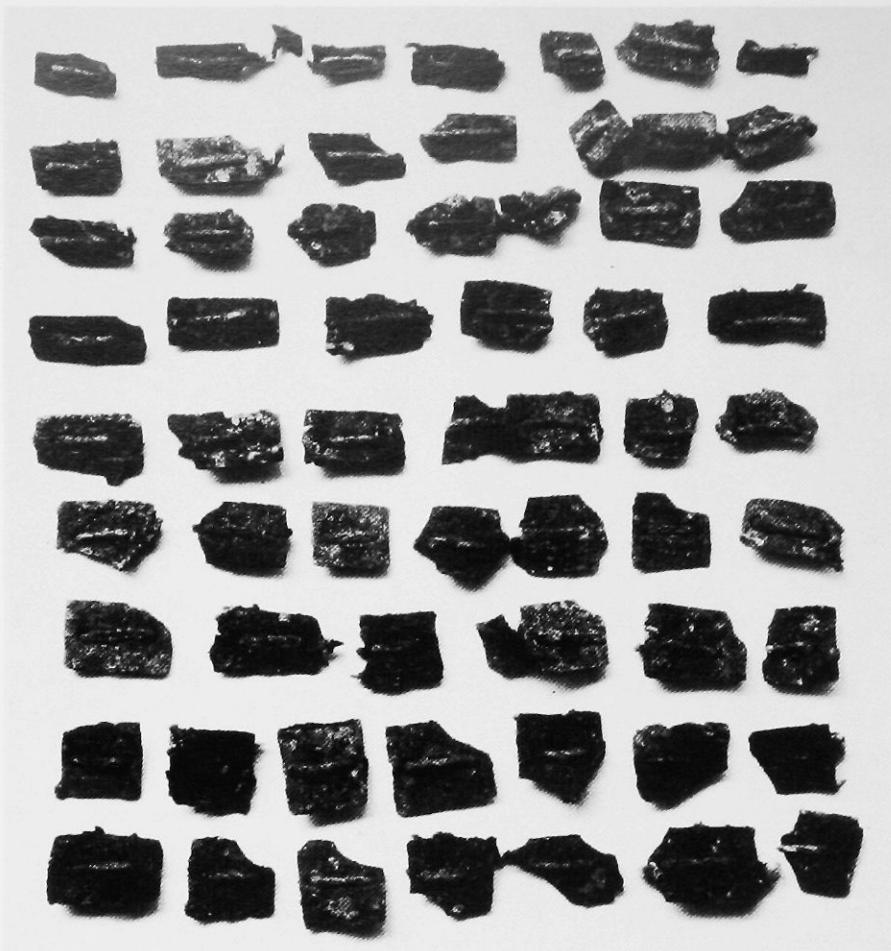


Fig. 2. Samples of the gilded copper plates with cordage still in place along median line of plates. From shaft tomb C-2, La Florida, Quito. Photo by David Bernard.

forms a "dash" in the center of the exterior surface of each gilded plate. On the obverse side, the thread passes through the cloth foundation for the plates, a twill fabric constructed from camelid hair yarns (described below).

Worked and unworked shell also marked the high-status burials. Cut and polished beads from the marine "thorny oyster" were especially common; over 5 kilograms of red-orange, purple, and white beads from *Spondylus princeps* or *Spondylus calcifer* were removed from the six shaft tombs (Doyon, personal communication, January 1989). Often these beads were still joined by a length of string, suggesting that they were worn as necklaces (fig. 3). In addition, mother-of-pearl, probably *Pinctada mazatlantica* (Doyon, personal communication, April 1989), was cut into rectangular plates (fig. 3). In size and shape, they are virtually identical to the metal ones described above, and must have been similarly attached to a base fab-

ric, which has now deteriorated. Also found were numerous examples of polished and cut *Conus perplexus* (fig. 3). These cone-shaped spiral shells were often located adjacent to the mother-of-pearl plates, although evidently attached to a different cloth. Doyon observed that the *Conus* shells were typically located around the legs or the pelvis of high-status burials; these were then frequently overlaid with layer(s) of mother-of-pearl plates (personal communication, April 1989). Perhaps a hypothesis can be risked: that the *Conus* was intended to simulate a dense, fringe-like border on a tunic or the front panel of a loincloth, while the cloth with mother-of-pearl plates might have served as a shroud.

The list of textile-related grave goods discovered at La Florida might also include feathers whose presence was detected on a few gilded copper disks. While admittedly meager, the evidence does hint at the possibility that feather-work may have been practiced. The tombs also contained metal pins that might have served as fasteners for garments, including one with the head shaped like a monkey (Doyon 1988, p. 64, no. 118). In addition to the textile-related artifacts discussed above, numerous other mortuary offerings were present. A brief and incomplete inventory would include: a large quantity of ceramic vessels (evidently filled with offerings) and articles made from gold, copper, or gilded copper, pyrite, quartz crystal, and in one instance a donut-shaped emerald (Doyon 1988; Doyon ms.).

Many of the elite goods that distinguished the high-status burials were not only textile-related, but frequently contributed to the very survival of the cloth. Evidently, copper artifacts were especially effective instruments of preservation, since the majority of La Florida's textile fragments were found clinging to pieces of corroded copper. The destructive activity of microorganisms on organic matter tends to be inhibited by the crusty coating of blue-green copper oxide that covered virtually every copper surface, even the gilded ones. Not surprisingly, therefore, the tomb with the richest store of copper (or gilded copper) artifacts, C-2, also contained the majority (90.8%) of the surviv-

ing fiber products (see Table I).

Of the 157 textile fragments analyzed from C-2, over 130 originally formed parts of just two cloths: a heavily-textured cotton plain weave and a camelid hair twill. This high rate of survival of these two fabrics resulted from the fact that both were consistently found embedded into the copper oxide surfaces of the rectangular plates described above (fig. 4-5). Dozens of additional examples of these gilded copper plates were recovered from C-2, so that those textile fragments not found directly affixed to copper nonetheless often bore the blue-green stain characteristic of copper oxide. The presence of copper also accounts for some of the fiber preserved in tombs P-1 and P-4, although the significantly lower frequency of copper grave goods in these tombs is matched by a parallel reduction of extant fabric.

Less often, mortuary offerings of worked and unworked shell served to minimize the natural deterioration of fibers expected in Ecuador's wet climate. In tombs P-2 and P-4, calcium carbonate leached from shell preserved the only examples of gauze weaves recovered from the site. In another instance, a plain-weave fragment remained affixed to the long bone of a skeleton, while another example survived on the surface of a potsherd, possibly due to iron oxide leached from the clay body.

The fragility of the poorly-preserved La Florida textiles posed significant problems for the excavators, who were already working under very adverse conditions some 50 feet below ground level. When the moist textiles were allowed to dry, their fibers tended to disintegrate to the touch. Experiments with PEG (polyethylene glycol) demonstrated that spraying each specimen with a light concentration of this water soluble wax would stabilize its fibers. Reassuringly, the treatment is 100% reversible. Thereafter, each newly encountered fragment was sealed with PEG, and prior to storage, was supplied with a label that identified its tomb of origin, as well as the excavation sector and level within each tomb.

The textile analysis began in January 1989 with the careful cleaning of hundreds of PEG-impregnated fragments. Even at

this stage of the analysis, the disparity in the textile survival rate within the four tombs was glaringly apparent. Three of the tombs were represented by a total of only 16 small woven fragments (Table I). With so few surviving fragments, it was recognized that no conclusions could be reached regarding the original function of the fragments within their mortuary context, despite the exacting notations of their positions within the tombs. In tomb C-2, where the preservation factors were considerably better, the promise of obtaining data that might encourage informed judgments regarding original usage was dimmed by the fact that a significant portion of the tomb's contents was disturbed by *huaqueros* (grave robbers).

As a consequence, the analysis of La Florida's textiles proceeded primarily on the basis of the technical evidence present in the fragments themselves. Such a study could only determine with any certainty which fragment, or group of fragments, could not possibly belong to the same cloth as another fragment, or group of fragments. Attempts to segregate one or more fragments from the rest relied on the notations regarding the tomb of origin, the presence of some distinctive technical feature, or a combination of features. Thus two or more fragments with roughly the same set of characteristics would be considered one sample (irrespective of whether they were once part of the same cloth or different cloths). By applying this

Fig. 3. Examples of the purple, red-orange, and white Spondylus beads and tubular beads, of which copious quantities were recovered from La Florida. Holes drilled into the mother-of-pearl plates and the cut Conus shells indicate that these items were probably intended for attachment to a cloth base. Photo by author.



Table I La Florida Textile Summary

SHAFT TOMBS / WEAVE STRUCTURES	MINIMUM NUMBER OF DISTINCT WEBS	TOTAL* FRAGMENTS
SHAFT TOMB C-2:		
Plain weave:		
single yarns in both the warp and weft	8	86
paired yarns in one set of elements	2	15
paired yarns in both the warp and weft	1	1
Plain Weave Total	11	102
Twill	1	50**
Braiding	2	5
Undetermined (matted fibers)	—	18+
Cordage	—	50+
	C-2 Totals	14
		225
SHAFT TOMB P-1:		
Plain weave (all 1/1)	3	6
Cordage	—	2
	P-1 Totals	3
		8
SHAFT TOMB P-2:		
Gauze (plain)	2	2
Cordage	—	1
	P-2 Totals	2
		3
SHAFT TOMB P-4:		
Plain weave (all 1/1)	2	5
Gauze (simple alternating)	1	1
Braiding	1	2
Undetermined (matted fibers)	—	4
	P-4 Totals	4
		12
Totals for All Four Tombs	23	248
Less cordage and undetermined fragments		72
Total Number of Textile Fragments Analyzed		176

* Totals do not include the two artifacts in the Quito gallery which were unavailable for analysis.

** Camelid fiber was used exclusively in the twill fragments. The fiber used in all the remaining fragments is cotton, with the exception of four pieces of cordage made from unspun leaf (*Furcraea?*) fiber.

methodology, it was determined that there were at least 23 different textiles represented in the four tombs, including 16 examples of plain weave (one with tapes-

try sections), one twill cloth, three gauze weaves, and three braids (see Table 1).

More problematic was the attempt to discern which textile fragments originally

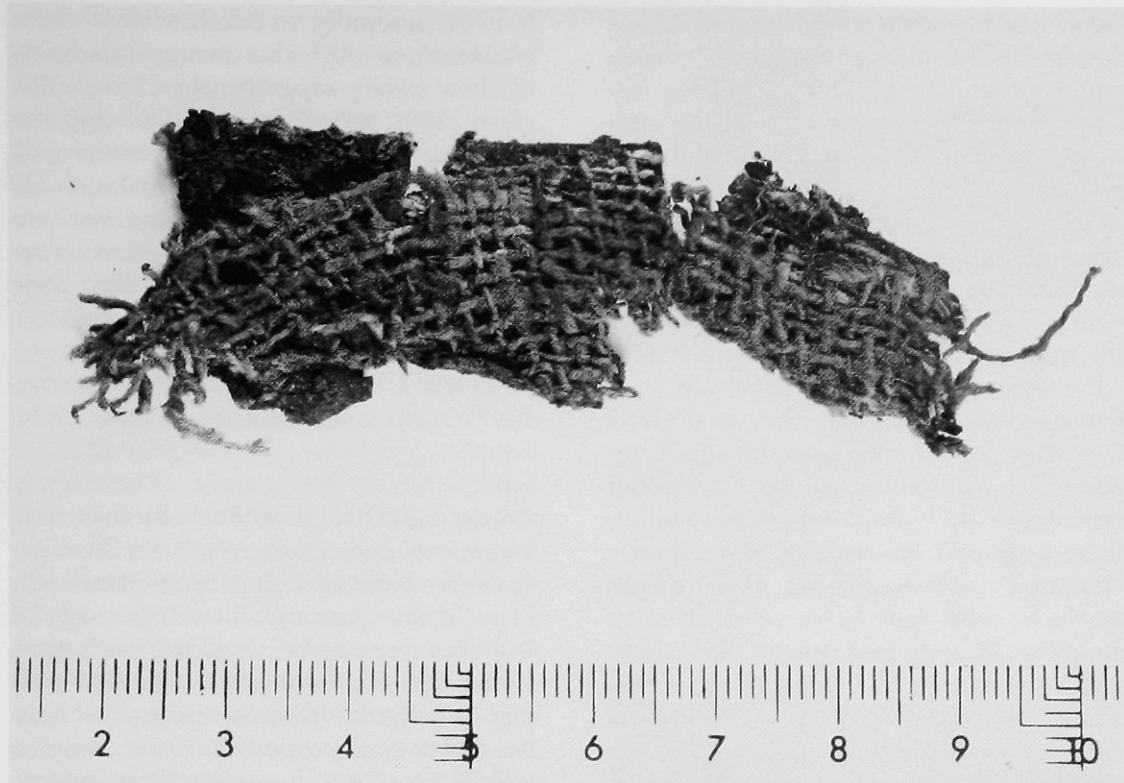


Fig. 4. Fragment of the coarse plain weave preserved on the exterior of the gilded copper plates from shaft tomb C-2, La Florida. The irregularly-spun cotton yarns have "nubs" which create a textured appearance.

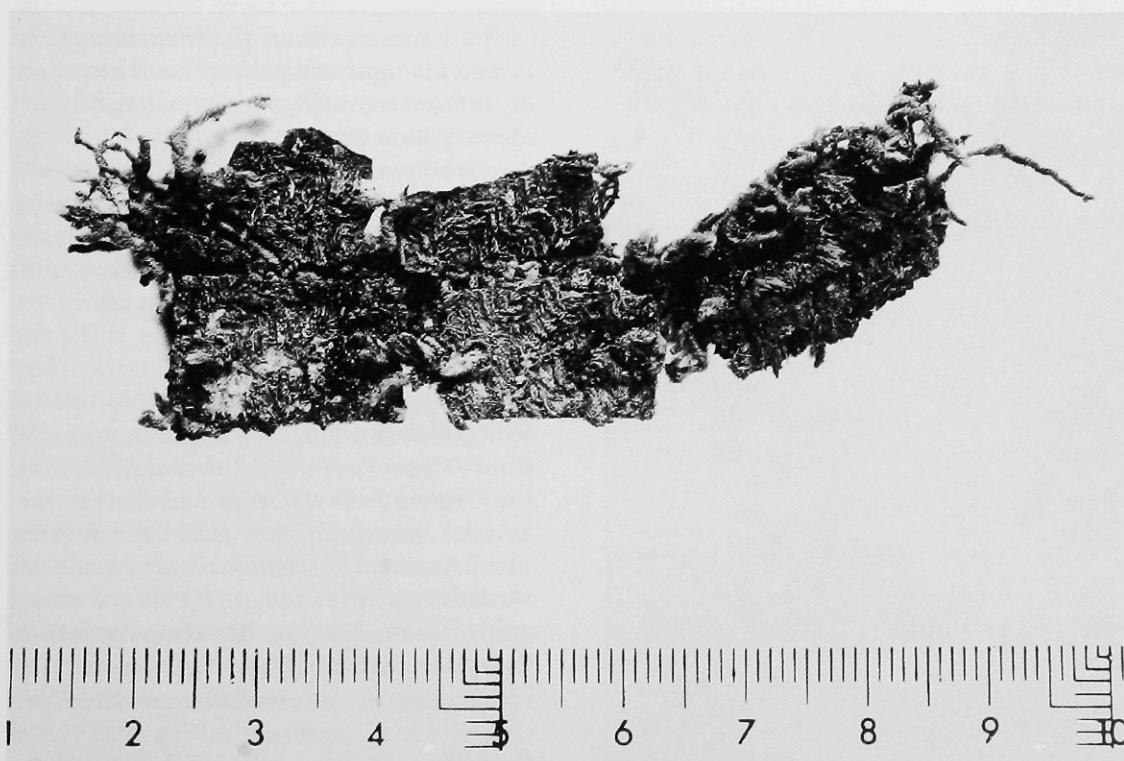


Fig. 5. Reverse side of the artifact in Figure 4. Barely visible on the gilded copper plates are the deteriorated plied yarns of a 2/2 twill. This camelid hair cloth served as the base fabric for the plates. Photos by David Bernard.

may have formed part of the same cloth. The effort was supported by the data recorded for each catalog number: 1) the fiber used; 2) the direction and degree of

spin; 3) the texture of the yarns; 4) the color, whenever distinctive; 5) the yarn count in both directions; 6) whether the surface appeared compact or loose; 7) if

Fig. 6a. Two plain weave structures are woven on the same warp. The loose plain weave (1/1) of the upper section contrasts with the more compact, discontinuous wefts of the tapestry weave (2/1) below. All the surviving fragments of this textile were found adhering to the exposed surfaces of the coarse, heavily-textured weave pictured in fig. 4. Photo by Jennifer Kensler.

the sets of elements were balanced or one dominated the other; 8) the type of weave; and 9) other observations, including factors affecting the preservation of the fragment, such as attachment to another artifact.³

Patterns in the data clearly emerged among a number of fragments whose similar characteristics were confirmed by visual inspection. Through this process, the fragments from three separate textiles were securely identified. All three were found in association with the metal plates in tomb C-2, and consequently were comparatively well-preserved. On the exterior surfaces of the gilded copper rectangles, there appeared the remains of a coarsely "textured" plain weave (fig. 4). This cloth

was occasionally overlaid with a sheer plain-weave cloth that incorporated sections of heavy tapestry (figs. 6a-c). The third cloth, a twill fabric, blanketed the interior surfaces of the plates and undoubtedly served as the foundation for the gilded plates (fig. 5). These last two examples were the most distinctive funerary garments at La Florida in both their decoration and composition.

General Characteristics of La Florida's Textiles

Fiber

Cotton is the fiber common to all the textile fragments and cordage from La Florida, save the twill of C-2, which alone uses camelid fiber yarns. Some minor usage of leaf fiber also may be noted, but it is limited to the four modest pieces of simple braiding. Initially, the fibers were classified only by their visual properties. Later, samples from each of the three categories, cotton, camelid fiber, and leaf fiber, were submitted for microscopic analysis to Patricia Estevez of the Laboratories of the Museum of the Banco Central in Quito. The laboratory reports reassuringly confirmed the visual identification in all cases.

Specimen slides from the twill's yarns were made in the Museum laboratories by scraping the back of a few of the rectangular copper plates from C-2. A substantial amount of debris was consequently included in the sample along with the powdered remains of the twill. The archaeological sample was then compared to a prepared slide of modern camelid fibers (figs. 7a-b). Under magnification, the hairs in both samples had the appearance of smooth, hollow tubes, confirming the presence of camelid hair in the La Florida sample. Since the fleece of all Andean camelids has the same conformation, a positive determination of the specific species involved was not possible.

Spinning

All of the cotton yarns used in the manufacture of La Florida's textiles are constructed from single-ply, S-spun yarns. These cotton yarns universally demonstrate that a strong twist was applied during the spinning. The majority of yarns are



classified as tight, or between 25 to 45 degrees, as measured by the angle created between the slant of the fibers and the midline of the yarn (Emery 1980, p.12). The remaining cotton yarns, represented by approximately a dozen fragments, meet or exceed a twist of 45 degrees. As a consequence, these overspun, or crepe, yarns turn back upon themselves, and provide the cloth with an elastic quality. Since this elasticity would be defeated in denser structures, crepe yarns are generally found in the looser weaves of the sample.

The only two-ply yarns at La Florida are found in cordage and in the camelid hair twill. Both the warp and the weft of the twill employ yarns that are S-spun and Z-plied. Similarly-plied cotton cordage (S-2Z) attaches the rectangles of gilded copper to the twill. The only yarns at La Florida with a moderate degree of twist are again those of the anomalous twill which straddle the medium and tight categories as defined by Emery (1980, p. 12). The lower torsion can be explained by the very act of plying. In the process, the two yarns are spun in the opposite direction, thus reducing the degree of the original twist.

The yarns at La Florida tend to be spun with remarkable regularity. Only two cloths in the entire sample use relatively coarse yarns, both of which are found on the outer surface of the copper plates in C-2. One is a heavily "textured" cotton cloth that will be described further in the section on plain weaves below. Its irregularly-spun yarns have "nubs" that contribute to its textured appearance. The second example is represented by three small, plain-weave fragments. While the yarns of these examples are the thickest ones found at La Florida, the designation is purely relative, for the average diameter of these "thick" yarns is slightly under a millimeter. Even the irregular "nubs" of the yarns that characterize the "textured" plain weave are not wider than a millimeter and a half. At the other end of the spectrum, the thinnest yarns are finer than modern sewing thread, less than one-quarter of a millimeter across (fig. 8).

Dyes

None of the samples was chemically tested for dyes. If brilliant colors formerly existed,



all were reduced to variations of cream, beige, tan, brown, and gray. Nonetheless, certain fabrics were decidedly reddish in hue, while others, like the twill, had a definite bluish-gray cast. Even the tan fragments were not uniformly drab, but hinted of colors long since faded.

Plain weave

More plain weaves survive in the La Florida inventory than any other single class of woven materials. The 113 fragments

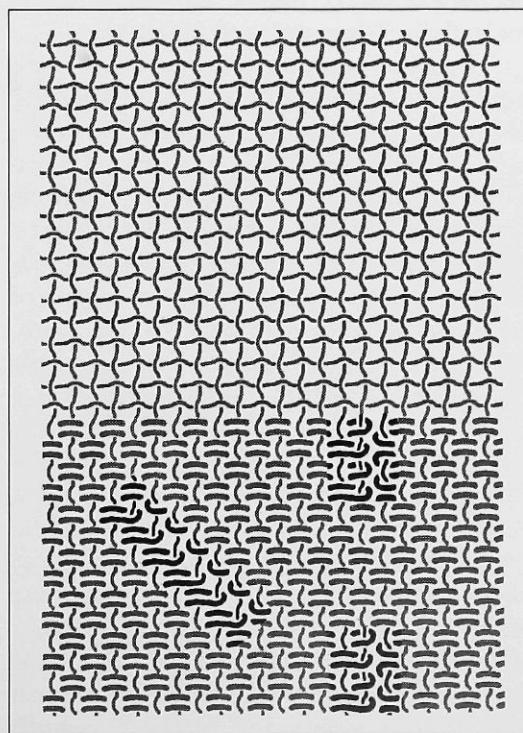


Fig. 6b. Typical section of the tapestry-weave "border". Most of the thin warps have deteriorated, leaving "crimps" in the paired, discontinuous wefts. (Those warps remaining intact have been highlighted in the photograph.) Visible on the right-hand side of each weft are loops, which were created when the single weft yarn turned back upon itself in this variation of the tapestry technique. Photo by David Bernard.

Fig. 6c. Structural diagram of the tapestry weave illustrated in Figs. 6a and 6b. The darkened portions highlight the joins between two sections of the discontinuous weft. Shaft tomb C-2, La Florida. Diagram by Peg Smith.



Fig. 7a. Microscopic photograph of modern camelid fibers. The smooth exterior surface of the hollow tube-like structures differ from the fleece of European sheep, which has a scaly surface.

extant comprise over 75% of the total number of woven fragments analyzed (Table 1). Within the plain-weave category, the most common variety is the simplest, wherein single yarns are used for both the warp and the weft. These constructions represent nearly 86% of the plain-weave samples. Of the remaining plain-weave fragments, fifteen utilize pairs of yarns in one direction, while just one fragment testifies to the occasional use of paired, single-ply yarns for both the warp and weft (Table 1).

Further distinctions can be made between La Florida's plain weaves by observing the number of warps and wefts per centimeter, and the spacing of these elements. Within the plain-weave sample, weaves that are characterized as very loose to moderately loose tend to be balanced; that is, the warp and weft are equally visible on the surface of the cloth. Paradoxically, the fragment with the highest record of yarns in both directions (16 x 18) has a surface appearance that is classified as "loose," due to the unusually fine yarns used for both sets of elements. At the opposite end of the spectrum, the moderately-compact and compact weaves almost always have a surface in which one set of elements is dominant or entirely eclipses the other. One notable exception is the single example of plain weave with both paired warps and wefts; it is both

compact and balanced to complement the additional strength supplied by the paired yarns in both directions.

Only one plain weave at La Florida exhibits any evidence of selvedges. A loose, balanced plain weave from shaft tomb C-2 retains a short section of what is presumably the warp selvedge, with the end loops intact. In the first two sheds, the yarns are notably thicker than the subsequent wefts. Moreover, they pass through the warps in pairs, while the remainder of the fragment uses single yarns in both directions. The identification of this fragment as a warp selvedge is based on the fact that the pairing of thicker weft yarns at both ends of a warp would be a highly-effective mechanism to evenly separate the thin warps and to maintain that distribution throughout the weaving.

A coarse, highly-textured weave requires additional scrutiny, if only because it is the best preserved fabric at the site (fig. 4). Sixty-nine of the 102 plain-weave fragments from C-2 are apparently from the same rough cotton cloth. This moderately loose and balanced plain weave is easily segregated from the others by the color and composition of its cotton yarns. The natural, off-white fibers are the only ones at the site that are clearly not dyed. Furthermore, they are spun so unevenly as to render a "nubbly" appearance, another characteristic unique to this rough cloth.

The remnants of this "nubbly" or highly-textured weave are almost always found in direct contact with the gilded copper plates of C-2, or broken portions of these plates. Whenever present on the surface of the plates, the rough textile always blankets the side on which cordage is visible along the center of the plates (fig. 2). It is evident, however, that the rough cotton textile cannot be the base fabric for the plates, for the cordage that laces through the plates never passes through the rough cloth. Moreover, its "nubbly" yarns often stretch in haphazard directions, very often counter to the orientation of the plates. The amply preserved fragments of this textured cloth probably functioned as a modest wrapping, one used to protect the exterior surface of the richly arrayed textile beneath.

Most often it is this protective wrapping, not the cordage nor the base fabric, that secures the gilded plates in their original alignment. As the plates corroded, the yarns of the roughly textured cloth became firmly imbedded into the encrusted copper oxide surfaces. In figures 4–5, the two nearly whole copper plates and the broken portions of three others are held in place by the "nubbly" yarns of the cotton cloth. This fragment and others confirm that the copper rectangles were tightly arranged in close parallel rows so that their glittering surfaces must have almost completely obscured the base fabric to which they were sewn.

Plain weave with discontinuous wefts (tapestry)

Another plain weave from tomb C-2 merits additional attention for its unusual construction (figs. 6a–c). Of the several fragments that survive, three fortuitously preserve evidence that this cloth originally combined two different plain-weave structures on the same warp: a loose, balanced plain weave with thin crepe yarns, and a tapestry weave with paired, closely spaced wefts (figs. 6a–c). The warp is judged to be the common element, even in the absence of selvedges, because the paired yarns are discontinuous, *i.e.*, they do not traverse the full width or length of the cloth. Since it is infinitely more difficult to incorporate discontinuous yarns in the warp direction,⁴ the paired yarns are assumed to be tapestry wefts (fig. 6c).

The loosely-woven section (fig. 6a) of this unique specimen must have been relatively elastic when first woven, due to the "spring" characteristic of overspun yarns. At regular intervals along the warps and wefts, this stretchy cloth was apparently embellished with additional yarns in a pattern resembling a "stepped" or "step-fret" motif. Attempts to discover whether these non-structural yarns were incorporated as the weaving progressed, or were subsequently embroidered on the finished cloth, were thwarted by the fragility of the yarns. The thin yarns of this loosely-woven section were especially vulnerable, disintegrating at the merest touch.

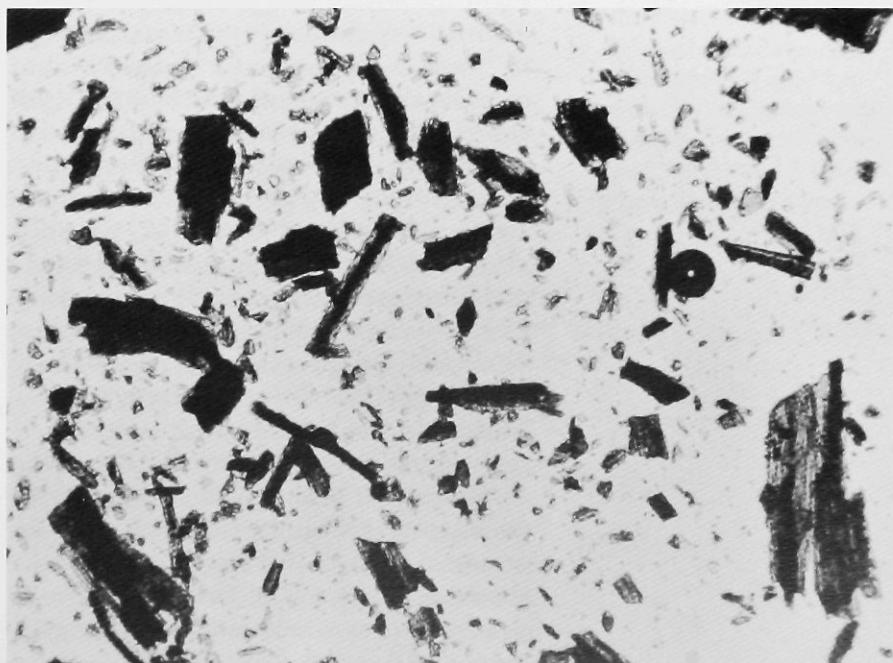
A larger number of fragments are preserved from the adjacent tapestry section,

perhaps because the yarns are both sturdier and more readily distinguished from the remaining sample. Even when the thin, crepe yarns of the warp have all but disappeared, the heavier weft yarns often remain intact. The original location of the deteriorated warp is nonetheless easily identified by the permanent "crimp" left in weft pairs (fig. 6b). The paired wefts of this tapestry section are battened down sufficiently to create a moderately compact web, but not so hard as to entirely hide the widely-spaced warps from view. The thin warps originally may have been more noticeable before the subsequent centuries reduced the color of the yarns to various shades of beige and brown. The warps, like the wefts, of the elastic plain-weave section have a drab, gray cast, while the thicker tapestry wefts have a decidedly deep-maroon tinge.

The most distinctive feature of the tapestry weave, however, is the manner in which the weft was laid into the shed. Although it initially appears that two separate weft yarns are in the same shed, further inspection reveals that it is the same yarn folded over itself. A single weft yarn is first inserted in the shed for the length of the design unit (or color); then that same weft yarn is carried around the warp at the end of the design segment, turning

Fig. 7b. Microscopic photograph of the material scraped from the interior side of a copper plate. Among the debris are short segments of camelid fibers belonging to the twill fabric from shaft tomb, C-2, La Florida.

Photos by Laboratories of the Museum of the Banco Central, Quito.



back over itself to the point of origin (figs. 6b–c). In the photograph of figure 6b, the maroon wefts preserve the loops which were formed when they encircled the last warps in the design segment, even though these warps have now completely disintegrated. Other weft yarns used in this tapestry section have also disappeared, but their presence in a contrasting hue(s) must be inferred by the discontinuous weft technique.

The number and condition of these tapestry fragments do not allow for a reconstruction of the original motifs, but it may be supposed that the design was generally geometric, built along the vertical, horizontal and diagonal. The surviving weft segments support this speculation as they tend to be divisible into rectangles and parallelograms (figs. 6b–c). It is tempting to further speculate that the tapestry design echoed the "stepped" pattern outlined in the adjoining section, although neither area is preserved sufficiently to permit a reconstruction of the motif(s).

The location of the tapestry design within the larger web must rely on informed speculation. It would seem that the most logical and functional arrangement would be to create two tapestry borders along the terminal ends of the warps. On the loom, the thicker weft shots of the battened tapestry would be laid in first, and would provide an effective mechanism by which to separate the warps evenly. Off the loom, the weight and firmness of the battened borders would stabilize the natural elasticity of the lightweight, loosely-woven section, which might otherwise prove unwieldy.

Twill

Shaft tomb C-2 provides the only evidence of twill construction at La Florida. All the 50 surviving twill fragments are found adhered to the inner surfaces of the gilded copper plates from that tomb (fig. 5). Undoubtedly this singular twill fabric served as the base fabric for the plates. The atypical construction and decoration of the twill garment or shroud is matched by the unusual nature of its yarns. As noted above, the only use of both camelid hair and 2-ply yarns are found in this sumptuous mortuary cloth.

The twill is far more deteriorated than the number of preserved fragments would seem to indicate. Whereas a single fragment of "nubbly" cloth may be attached to several plates, the number of preserved twill fragments equals the number of plates with twill still attached to them. In many cases, little more than shadows of the original yarns of the twill remain etched into the corroded surfaces of the copper plates. Nonetheless, the diagonal arrangement characteristic of a 2/2 twill is immediately identifiable.

Three plates retain evidence of what appear to be the reinforced side selvedges of the twill. Apparently, the side selvedges are purposely strengthened with supras-tructural yarn(s). The finish is most likely a simple variety of loop stitch embroidery (see Harcourt 1962, p.134, fig. 97). This identification is made solely on the visual appearance, since the fragile yarns tend to disintegrate with every attempt to dislodge them from the encrusted copper oxide.

Gauze

Two examples of plain gauze weave represent the only fabric recovered from shaft tomb P-2 at La Florida (Table 1). Each of these separate cloths is found stretched over the surface of a shell, the larger of which is identified as *Fasciolarium princeps*, while the smaller shell is from a terrestrial gastropod (Doyon, personal communication, January 1991). The outstanding feature of both gauzes is their finely-spun yarns. On the marine shell, the gauze yarns are so thin that a magnifying glass is needed to observe that the crossed warps of this plain gauze weave are manipulated in pairs, while a single yarn serves as the weft (cf. Emery 1980, p. 182, fig. 283). Still attached to the outer surface of this same gauze weave are the merest fragments of another sturdier cloth(s).

A third example of gauze weave (fig. 8) is one of approximately a dozen fiber artifacts encountered in shaft tomb P-4. This single fragment of simple alternating gauze weave is preserved on a piece of mother-of-pearl, one of numerous rectangles of cut polished shell (*Pinctada mazatlanica*) that was found around the pelvis of a P-4 skeleton. Similar mother-of-pearl

plates distinguish the remains of some high-status burials in tomb C-2 as well (Doyon, personal communication, April 1989). These shell rectangles, like their metal counterparts, must have been attached to a base fabric, one comparable to the copper-studded textile from C-2. However, the delicacy of the P-4 gauze would seem to preclude the possibility that this textile served as the base fabric for the relatively heavy rectangles of mother-of-pearl.

Braids

Of the five examples of braiding recovered from shaft tomb C-2, four are of the simplest variety, the three-strand braid. The fiber is equally humble, unspun leaf, possibly *Furcraea andina* (Towle 1961, pp. 32–33).⁵ The remaining example from C-2 demonstrates a knowledge of more sophisticated forms of braiding. Evidence is provided by a round cotton braid, whose length measures only 2.2 cm. (approximately one inch) and whose diameter is thinner than the average pencil. Once again, poor preservation prevented an exact determination of the movement of each separate yarn, for they tended to disintegrate upon examination. Nonetheless, it was possible to discern the merest evidence of color changes on the gray surface of the cord, and to establish that sixteen single-ply yarns were used in its manufacture. In Peru, this general class of braiding is widely found in pre-Hispanic, colonial, and contemporary contexts, and is often associated with the manufacture of patterned slings. (See Cahlander 1980; Harcourt 1962, pp. 83, 85–88).

Comparison to Related Textile Collections

The data retrieved from the study of coastal textile manufacture provides an important context for comparison with the 176 textile fragments unearthed at La Florida in the northern Ecuadorian highlands. Those from La Compañía in particular provide a significant gauge by which to evaluate the characteristic features of La Florida textiles, since both lots were associated with high-status burials. The textile



impressions found on ceramic sherds from coastal sites also furnish important comparative data, even though the original cloths were woven to fulfill the domestic needs of the living,⁶ rather than honoring the memory of the dead.

Not surprisingly, the closest parallels to La Florida's textiles can be found less than 200 kilometers away, in the southern Colombian highlands where the indigenous weaving tradition is recorded in the shaft tombs of Nariño department. Unfortunately, the textiles from these burials have come to light as a result of *huaquero* (grave robbing) activity or salvage archaeology. Nonetheless, three of the four groups analyzed by Cardale de Schrimpf (1979) are associated definitively with a specific cemetery. The most complete textile specimens are preserved from the shaft tombs at Miraflores and El Cultun immediately across the Ecuadorian border in the towns of Pupiales and Ipiales respectively. The former cemetery is associated with a radiocarbon date of A.D. 1250 ± 35 (Cardale de Schrimpf 1979, p. 248).

Fig. 8. The very delicate yarns of this alternating gauze weave stretch over the surface of a cut piece of mother-of-pearl (*Pinctada mazatlanica*). The two perforations in the shell retain evidence of the cordage used for probable attachment to a stronger base cloth. From shaft tomb P-4, La Florida. Photo by Leon Doyon.

Fiber

At La Compañía, cotton is the only fiber whose identity was determined microscopically, although Gardner did not rule out the possibility that future microscopic studies of the site's yarns might isolate the presence of camelid fibers (Gardner 1979, p. 30; 1985, p. 328). The camelid hair yarns used in La Florida's twill, therefore, are the only securely identified examples from pre-Hispanic Ecuador. The recovery of camelid fiber around Quito has implications for those archaeologists who are concerned with the first llama pastoralism in Ecuador. The sudden appearance of the bones of an "undersized llama" in the late Formative levels at Pirincay, attest to the rapid adoption of camelid herding in southern Ecuador around 120 B.C. (Miller and Gill 1990, p. 55; Bruhns, Burton, and Miller 1990, p. 232). Faunal remains in the northern provinces of Ecuador, however, remain sporadic, as Stahl's review of the pertinent literature demonstrates (1988).

Still further north in the Colombian department of Nariño, fully five of the 13 cloths studied by Cardale de Schrimpff are fashioned from camelid hair yarns, two each from Miraflores and El Cultun, and another simply designated as "Valle de Pasto" (1979, pp. 250–256, 259–261). Cotton still remains the most common fiber, but the relative quantity of camelid fiber in these mortuary textiles raises the expectations of additional discoveries of camelid fabrics from Ecuador. It is not impossible to imagine that pastoralism became a significant part of the local economy in the Quito region some four to five centuries after its initial appearance in southern Ecuador, or that it continued to spread northward into the Nariño altiplano by the next millennium.

Spinning

For the most part, the spinning techniques at La Florida are consistent with those reported for the coastal regions of Ecuador. Cast impressions from Chorrera, Bahía and Jama-Coaque demonstrate that the original textiles from all three lots had been constructed exclusively from S-spun, single-ply yarns (Stothert *et al.* 1991, p. 773). Three imprints from the Río Tambo region, however, testify to the infrequent

use of plied yarns (S-Z) in gauze weaves (Stothert and Epstein n.d., Table 3). At La Compañía, S-spun, Z-plied yarns do serve minor roles as heading cords and joins, but the fabrics themselves are manufactured exclusively from single-ply, S-spun elements (Gardner 1985, p. 334). The lump of clay from a late Valdivia context, on the other hand, retains the impressions of yarns that were spun in the opposite direction. When Marcos magnified the pliatex rubber cast made from the fired lump of clay, single-ply, Z-spun yarns were revealed (Marcos 1979, p. 23). It is evident from this inventory that the Ecuadorian textile industry relied almost exclusively on single-ply, S-spun yarns for both the warp and the weft, even though plying was undoubtedly a universal practice, especially for cordage.

Plied warps and wefts, though rare in Ecuador, are nonetheless common among the textiles of the Nariño department. Cardale de Schrimpff observes that the twill fabrics from the Miraflores cemetery tend to employ plied yarns (S-2Z) for both sets of elements, while those of plain-weave cloths are more likely to be simply S-spun (1979, p. 264). An even greater correlation may be noted between the use of camelid fiber and plied yarns. While the practice of plying is found among both cotton and camelid hair yarns of Nariño, all recorded instances of the latter were reported to be plied (Cardale de Schrimpff 1979). This correlation may reflect a tradition that extends south into highland Ecuador. Since only one camelid hair cloth was found at La Florida, it follows that only one cloth uses plied yarns in its construction.

Dyeing

The extent to which dyes were used with cotton in pre-Hispanic Ecuador will not be satisfactorily resolved until more material evidence is found and a large quantity of suspect yarns are subjected to spectrum analysis. Since cotton is more resistant to dyes than animal hair, it can be safely assumed that the palette of colors available to the Ecuadorian weaver was limited until the introduction of camelid fibers. Both indigo and cochineal are indigenous to Ecuador (Meisch 1987, p. 47) but, if parallels

can be drawn from Peruvian prehistory, only indigo was used extensively on cotton. As Harcourt points out, cochineal was rarely used to dye cotton in Peru, for the resulting red lacked the intensity achievable with camelid fibers (1962, p. 6).

Meisch lists a number of natural dyes for cotton which have had some reported usage in the past 250 years in Ecuador (1987, pp. 48–49). It is conceivable, therefore, that some of the readily-available dye stuffs that Meisch listed could have been exploited at a much earlier date to produce not only blue and a dull red, but also yellow, olive green, purple, light brown, brown, and possibly orange, assuming that the requisite mordants were also accessible and their potential understood.

Another explanation for the diversity of hues, albeit muted ones, witnessed at La Florida would be that the weavers exploited the variety of hues naturally-grown in the Andean species of cotton. In a study conducted on the north Peruvian coast, Vreeland demonstrated that the indigenous farmers cultivated six different colors of cotton, many of which were still identified by their original native terms. Yarns produced from these naturally-pigmented cottons are white, sand/tan, dun/brown, dark brown, reddish brown, or steel gray (Vreeland 1986, pp. 364–365, fig. 7). Similar contemporary evidence comes from the Santa Elena Peninsula of Ecuador, where cotton is cultivated to maximize its potentially different hues (Hagino and Stothert 1984).

Testimony to a pre-Hispanic dyeing tradition in Ecuador can be found in the ikat from La Compañía (Gardner 1979, p. 25; 1985, p. 335), whose identity is dependent on dyes, and whose resist process remains a popular form of fabric design in Ecuador today. While the ikat could conceivably date to the period of Inca domination in the region, nothing in La Compañía's textile complex suggests Inca influence.⁷ The "shades of tan and brown" that now characterize the yarns leave open the possibility that the coastal spinners utilized natural shades of cotton. Nonetheless, the weaves employed seem to be those designed to capitalize on the potential of dyes: plaids, ikats, warp striping, as well as supplementary warp and weft designs.

Dyeing is reported to be a common feature of the Nariño mortuary textiles. Cardale de Schrimpff (1979) identifies several colors among both cotton and camelid yarns, although she concedes that the hues are muted due to the age and condition of the textiles. The textiles from both the department of Nariño and Los Ríos province are dated approximately one thousand years after La Florida, and could incorporate new technology that was introduced in the interim. Nonetheless, the suspicion that dyes were routinely used at La Florida with cotton was strengthened by the presence of decorative, discontinuous wefts in the cotton tapestry fragments (figs. 6a–c).

Plain weave

The largest single class of weaves represented in Ecuadorian collections are predictably plain weaves in all their permutations. Gardner's preliminary analysis of the textile fragments from La Compañía has identified several varieties of plain weave, including some compounded with supplementary sets (1979, p. 29; 1985, pp. 333–340). Among the textile impressions from the coast, plain-weave structures dominate all the samples studied. Variations on this theme are partially attributable to the use of single, paired, and even triple elements (Marcos 1979, p. 23; Stothert and Epstein n.d., p. 24; Stothert *et al.* 1991, p. 771). Another plain weave from the Río Tambo region of the coast should be singled out, for its yarns occasionally skip their regular interlacing to create floated passages. Associated with Guangala 6–8 excavation levels (A.D. 600–800), this plain-weave-derived float weave (Stothert and Epstein n.d., pp. 19–20, fig. 8) may preserve the earliest evidence of a "picked" design.

Plain weave with discontinuous wefts (tapestry)

There are three fabrics that provide close parallels to La Florida's plain weave with tapestry sections: the fragment of one cloth is from the central Ecuadorian highlands near Riobamba (Estrada 1957), while the other two textiles are from El Cultun Cemetery of the Nariño region of southern Colombia (Cardale de Schrimpff 1979). All

three textiles are similar to the La Florida example in that two different weaves are incorporated on the same warp: one structure constitutes the central field of the web, while another forms narrow borders along the warp selvedges. The intact warp selvedge of the Riobamba example reveals a narrow border where two wefts are substituted for the single weft of the plain-weave field (Estrada 1957, pp. 82, 84–85, fig. 66). Structurally then, the Riobamba fragment is a close relative of the La Florida textile in its combined use of paired and single wefts on a single warp. However, the small Riobamba fragment lacks two significant design features that characterize the decorative tapestry border from La Florida: discontinuous and compact wefts.

Relative to these diagnostic features, the two mortuary textiles from El Cultun share a greater affinity with the La Florida specimen, even though they differ in other construction details. Unlike the cloth from La Florida, the two Nariño cloths have fields of twill weave instead of plain weave, and use single wefts, not paired ones, in their slit-tapestry borders (Cardale de Schrimpf 1979, pp. 253–256, pls. IX & X, figs. 10 & 11). Nonetheless, all three textiles share the same organizational design: loosely-woven fields flanked by tapestry borders at the loom selvedges. Moreover, the use of the “stepped-fret” motif in the Nariño tapestry borders lends credence to the possibility that La Florida’s tapestry was embellished with a similar design.

Twill

Aside from La Florida’s twill, the only other evidence of Ecuadorian twill weaving can be found imbedded in the clay of coastal figurines (Stothert *et al.* 1991, pp. 771–774 *passim*). Two small textile impressions on sherds from the Jama-Coaque culture feature a twill weave. The sample is broadly dated, on the basis of its cultural association, 500 B.C.–A.D. 500 (Stothert *et al.* 1991, p. 767). As these dates overlap with the radiocarbon date for La Florida (A.D. 340), the highland twill fragments may be judged as generally coeval with the coastal textile impressions of twill.

Just north of the Ecuadorian border, twill is the predominant form of fabric

construction in the mortuary cloths from Miraflores and El Cultun in the Nariño department. Of the total 13+ pieces of fabric and cordage recovered from the two cemeteries, nine cloths include some aspect of twill construction (Cardale de Schrimpf 1979, pp. 247–258). Two twill fabrics from El Cultun, as noted earlier, sport tapestry borders. The extensive use of twill and the structural varieties exploited, including diamond twills and discontinuous constructions (see note 4), clearly indicate a long period of prior exploration with twill weaving and its potential in Colombia.

The metal decoration on La Florida’s twill in C-2 may not be so uncommon to the region as it initially appears. Parallels can be drawn to the frequent recovery of quantities of small, gilded copper objects whose number and conformation suggest that they were once sewn onto cloth. From the cemeteries of the Nariño altiplano, Plazas de Nieto describes trapezoids, circles, diamonds, stars and other shaped pieces of metal that have holes or loops for attachment (1979, pp. 210–211, figs. 4, 1–8). Just south of the Ecuador/Colombia border, in the province of Carchi, Grijalva reports that small gold trapezoidal plates once decorated a mortuary textile (1937, pp. 226–227). At La Compañía on the coast, silver pentagons are attached to a plain weave in repeated rows (Gardner 1979, fig. 1). Gardner, in fact, attributes the survival of the La Compañía textiles to the frequency of copper articles placed in the burial urn (1979, p. 24).

Gauze

Prior to the discovery La Florida’s gauzes, the only prehistoric evidence for gauze weave in Ecuador was represented by the textile impressions studied by Stothert and Epstein. Fully 20% of their total sample, and 61.5% of the figurine sherds, bear the imprint of “recycled” gauze weaves (Stothert and Epstein n.d., pp. 22a, 24). With only one exception, all of these gauze imprints are associated with the Early Guangala excavation levels (n.d., p. 22a), and consequently anticipate those found at La Florida by at least a few hundred years.

Interestingly, Stothert and Epstein’s measurements of the yarn diameters for

the Guangala gauzes seem to be consistent with the data obtained for yarn sizes from the remaining imprints, in both contemporary and later samples (Stothert and Epstein ms., Tables 2 & 3). In contrast, the striking feature of all three gauze weaves at La Florida is the delicacy of their yarns, without exception among the finest detected at the site. Although the two samples are admittedly small, it is nonetheless tempting to rationalize the disparity between the sturdy Guangala gauzes and those from La Florida. Perhaps the Early Guangala weavers produced finer examples which were judged too delicate to be "recycled" in the manufacture of ceramics (see note 6). Perhaps too the mortuary gauzes from La Florida were purposefully fabricated for their intended purpose to wrap valuable shells. In these fabrics, the natural properties of gauze, its stretch, its delicacy, and its softness all seem suitably enhanced.⁸

Conclusion

The textile fragments from the shaft tombs at La Florida are not only the oldest extant fabrics from Ecuador, they also represent the first significant sample recovered from the highland region of that country. Within La Florida's collection are the only confirmed examples of discontinuous wefts (tapestry) construction and braiding, as well as the only tangible evidence for the use of camelid hair yarns during the pre-Hispanic era in Ecuador. Twill and gauze weaves are also represented, along with a variety of plain weaves, building on the known history for these weaving techniques in coastal assemblages.

Absent from the La Florida sample are patterned (figured, or fancy) float weaves, either plain-weave-derived or twill-derived (see Emery 1980, pp. 106, 123), although one example of the plain-weave variety was found in the Río Tambo region along the coast (Stothert and Epstein n.d., pp. 19–20, fig. 8). Only one example of the use of supplemental yarns is present, even though La Compañía's weavers regularly exploited this relatively easy means of decoration. Other more complex, compound structures are not detectable among La

Florida's woven materials.

Nonetheless, the lack of patterned float weaves or compound weaves should not be interpreted as proof that none of these techniques were practiced at La Florida.⁹ The author identified two pieces of bone among the La Florida artifacts as pick-up sticks used to select design floats in certain weaves. Similar weaving implements were discovered in southern Ecuador by Bruhns, most dating to the latter half of the first millennium B.C. (1990, pp. 72–73). If patterned float and compound weaves were once present in the shaft tombs of La Florida, these decorative fabrics may have been placed well within the protective layers of the burial bundles, and consequently would have been some of the first textiles to decompose due to their proximity to the corpse. The gold-plated textile of C-2 supports such a conclusion. As previously noted, the twill on the inner surface of the gilded copper plates suffered a much faster rate of decomposition than the cotton plain weaves on the outer surfaces. Presumably, the camelid fibers of the twill eroded much faster because this fabric faced the decaying body inside the funerary bundle. Some bits of cloth with very fine matted yarns did occur with frequency over the twill. Under magnification, a few yarns from these tattered remains appeared to skip their regular interlacing, but the exact nature of the structures could not be positively ascertained, because the fragments were either too small or too deteriorated.

In contrast, the remains of at least four different cloths are recognizable on the exterior side of the plates, in addition to a number of stray fibers and unidentified matted fibers. Two of these have been described at length in the preceding sections: the well-preserved textured cloth with its "nubbly" yarns (fig. 4), and the sheer plain weave with tapestry borders (figs. 6a–c). Evidence for two other plain weaves, one coarse and one delicate, comes from a mere four fragments. The delicate example is known from one small fragment found sandwiched between the highly-textured cotton fabric and a copper plate. The other plain weave is nearly as coarse as the textured plain weave (as noted in the section on spinning), but is

easily distinguished from the former by its higher yarn count and paired yarns in one direction. Only three small fragments of this second coarse weave survive, one of which is directly attached to the surface of a plate, while the other two fragments are preserved on top of the "nubbly" yarns of their more heavily-textured companion. Judging from this arrangement, both coarse weavings might have served as protective coverings for the copper-clad twill below. The sheer plain weave with tapestry borders always occurs over the heavily-textured one (its relationship to the second coarse cloth is unknown), and is the only cloth on the exterior of the gold plates which surely served more than a strictly utilitarian function. The elasticity of this sheer plain weave would make it an ideal head covering, so that a speculative reconstruction might place the garment over the head of the funerary bundle.

It is tempting to hypothesize that the twill fabric from C-2 was a trade item, for this sumptuous burial cloth does compare well with similarly-dated Moche materials from the north coast of Peru. The famous grave of the "Lord of Sipán" offers some obvious analogies. In the tomb, Walter Alva found banners and a tunic that were arrayed with golden plates, not unlike the example from La Florida. Moreover, it does not require a great deal of imagination to envision the conical gold pieces hanging from Sipán banners (Alva 1988, pp. 529–531, fold-out) as metal interpretations of the *Conus* shells found at La Florida.

Additional parallels are provided by the frequency of twill in the Moche textile collections. At Huancaco, Bird found that 28.4 percent of the textiles were twill-woven (1952, p. 359). O'Neale, in her classic study of Peruvian twill weaving, recorded that the eight "Early Period" twills available for analysis in 1946 were all Moche (Mochica) in origin (1946, pp. 269, 290–291), and "were all salvaged from among copper and silver specimens (p. 270)." The comparison ends here, however, for all of the Moche twills examined by O'Neale were constructed from cotton, not camelid fiber yarns. Moreover, the warp yarns of the Moche twills might be either plied or unplied, while the weft was always unplied (O'Neale 1946, pp.

290–291). In La Florida's twill, plied yarns were used for both sets of elements.

For students of the Ecuadorian weaving tradition, the absence of material evidence is a perennial problem. The dearth of extant textiles encourages a search for corollaries among the pre-Hispanic textiles of Peru, where the dry climate has favored the preservation of cloth. Such comparisons, while useful, may also lend the impression that the Ecuadorian weaving tradition was fundamentally dependent on technical developments in Peru. In the absence of hard data, it also becomes tempting to attribute the presence of anomalous cloths to trade that would credit Peruvian manufacture. It is hoped that the discovery of La Florida's textiles will soon be followed by others that will help to further define the native patterns of Ecuador's weaving tradition. Many already seem evident, for when the decoration, structure and material of even the most unusual La Florida specimens are considered separately, a precedent can be discovered for each attribute within the larger Ecuadorian/southern Colombian tradition.

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Notes

1. The test results of four radiocarbon samples drawn from two of the six tombs at La Florida demonstrate a high degree of conformity. All four of the unadjusted dates "agree at 1610 B.P. (A.D. 340), within the margins of error" (Doyon ms., p. 10 ff. #1).
2. Only sporadic references to the recovery of extant fiber appear in the literature. González Suárez, for example, illustrates a textile fragment found in a tomb from Carchi province (1910, vol. 2, pl. 39). He describes the fiber as "cabuya", dyed dark purple, but makes no mention of the structure (1908, vol. 1, pp. 139–140). Jijón y Caamaño diagrams a looped construction; he also notes the discovery of textiles "de hilos gruesos" in the shaft tombs of Urcuquí (1920, p. 185, fig. 40). From Libertad, Bushnell reports the excavation of two small, plain-weave fragments: one with single warp and weft yarns and one with paired yarns (1951, p. 99). Descriptions and illustrations of seven plain-weave variations are included in Estrada's study of the late cultures of the Guayas Basin; three of the coastal examples survive only as impressions on clay, while one fragment of mixed morphology is of highland origin near Riobamba (1957, pp. 79–85). In her doctoral dissertation on Carchi materials, Francisco reports that camelid fiber textiles were found in association with Capulí ceramics, but gives no further details (1969, p. 28). More recently, Buys and Domínguez illustrate a textile fragment from the private collection of José Pallares in a catalogue for an exhibition held in Quito (1988, pp. 46, 47, 85, no. 119). The catalogue assigns a Late Integration Period date to the Pallares collection and defines the textile as "made from sewn bands in a checkerboard design" (translation mine, see legend to no. 119). See also note 4 below.
3. In order to manage all these bits of data, I developed a 5-page "Table of Attributes", one that lists each textile with its salient characteristics. Anyone desiring a copy can write to me at the following address: Suzette Doyon-Bernard, Department of Art, University of West Florida, Pensacola, FL 32514.
4. Of related interest is the fact that two of the three cloths recovered from the nearby El Cultun shaft tombs have twill sections that utilize discontinuous and interlocking yarns in both the warp and the weft (Cardale de Schrimpff 1979, pp. 256, 258). The only Ecuadorian example of this tedious approach may be the Pallares cloth mentioned in note 2. When I viewed the Pallares cloth on display in January 1989, I immediately suspected discontinuous and interlocking yarns because of the distinctive "patchwork" design in the balanced plain weave. Unfortunately, I was unable to examine closely the joins in the design because the cloth was under a glass display case that was too heavy to be removed. For Peruvian examples, see Harcourt 1962, pp. 17–19.
5. Native Ecuadorians today use the term *cabuya* when referring to the fibers of both the *Furcraea* and the *Agave americana* plants. The former is used principally for ropes and woven bags, while the latter is used in the construction of some *shigras*, or looped bags (Ann Rowe, personal communication, 1994.) The agave plant in Ecuador probably postdates the arrival of the Spanish. As in Peru, agave is considered to be an introduction from Mexico and Central America during colonial times (Towle 1961, p. 32).
6. The textile imprints from Chorrera, Bahía, and Jama-Coaque sherds were judged by the authors of the study to be from cloths woven for a specific function, as a utilitarian aid in the manufacture of ceramics. This singular purpose may explain the striking degree of homogeneity among the Chorrera and Bahía impressions, while the Jama-Coaque lot evinced slightly more variety (Stothert *et al.* 1991, p. 774). In contrast, a greater diversity was found among the fabric impressions left on 50 sherds from the Río Tambo region of the Santa Elena Peninsula. The producers of these Guangala and Libertad ceramics, according to Stothert and Epstein, may have used rags or recycled materials (n.d., pp. 23–24), so that this sample could be expected to more accurately reflect the variety of weaves produced for domestic consumption (Stothert *et al.* 1991, p. 775).
7. Despite the late date for the La Compañía textiles, it is Meisch's informed opinion that the cloth fragments from Los Ríos province "appear to be part of an indigenous textile tradition" and are apparently free of any intrusive Inca influence (1987, p. 21).
8. A similar practice was observed in the mummy bales from Ancón, Peru (Ravines and Stothert 1978; Stothert 1979). Associated with a Late Horizon burial of a low-status female was one valve of the *Spondylus* mollusk, a marine oyster whose nearest source was the Ecuadorian coast. The interior cavity of this

thorny oyster had been filled with plant offerings, including a wad of raw cotton, and was then wrapped in additional raw cotton fibers and covered with a plain cotton textile "de malla abierta" (Ravines and Stothert 1978, p. 158), or made "with open meshwork".

9. In neighboring Peru, where the preservation factors are much more favorable to perishable materials, examples of these major weave classes appear in the archaeological record more than several centuries earlier, as demonstrated by a chronological ordering of their first recorded appearance in that country (Doyon-Bernard 1990, p. 70, Table 1).

References cited

- Alva, Walter
1988 Discovering the New World's Richest Unlooted Tomb, *National Geographic*, vol. 174, no. 4, Oct., pp. 510–550. Washington.
- Bird, Junius
1952 Appendix 3: Textile Notes, *Cultural Stratigraphy in the Virú Valley, Northern Peru: The Formative and Florentine*, by William Duncan Strong and Clifford Evans, Jr., pp. 357–360. Columbia Studies in Archaeology and Ethnology, vol. 4. Columbia University Press, New York.
- Bruhns, Karen Olsen
1990 Prehispanic Weaving and Spinning Implements from Southern Ecuador, *The Textile Museum Journal*, vols. 27 & 28, 1988–1989, pp. 70–77. Washington.
- Bruhns, Karen Olsen, James H. Burton, and George R. Miller
1990 Excavations at Pirincay in the Paute Valley of Southern Ecuador, 1985–1988, *Antiquity*, vol. 64, no. 243, pp. 221–233. Cambridge, England.
- Bushnell, G. H. S.
1951 *The Archaeology of the Santa Elena Peninsula in South-West Ecuador*. Syndics of the Cambridge University Press, Cambridge, England.
- Buyss, Jozef and Victoria Domínguez
1988 Un Cementerio de hace 2000 años: Jardín del Este, *Quito antes de Benalcázar*. Edited by Iván Cruz Cevallos, pp. 31–50, 67–85. Centro Cultural Artes, Quito.
- Cahlander, Adele with Elayne Zorn and Ann Pollard Rowe
1980 *Sling Braiding of the Andes. Weaver's Journal Monograph IV*. Colorado Fiber Center, Boulder.
- Cardale de Schrimpf, Marianne
1979 Textiles Arqueológicos de Nariño, *Revista Colombiana de Antropología*, vol. 21, 1977–78, pp. 245–282. Instituto Colombiano de Cultura, Bogotá.
- Doyon, Leon G.
1988 Tumbas de la Nobleza en La Florida, *Quito antes de Benalcázar*. Edited by Iván Cruz Cevallos, pp. 51–66. Centro Cultural Artes, Quito.
- ms. Comments on Ceramic Styles, Chronologies, and Prehistoric Sociopolitical Organization in the Highlands of Northern Ecuador and Southern Colombia: Radiocarbon and Contextual Evidence from La Florida, Quito. Unpublished paper presented at the 47th International Congress of Americanists, New Orleans, July 1991 (revised, December 1991).
- Doyon-Bernard, Suzette
1990 From Twining to Triple Cloth: Experimentation and Innovation in Ancient Peruvian Weaving (c.5000–400 B.C.), *American Antiquity*, vol. 55, no. 1, pp. 68–87. Society for American Archaeology, Washington.
- Emery, Irene
1980 *The Primary Structures of Fabrics: an Illustrated Classification*. The Textile Museum, Washington. Originally published in 1966.
- Estrada, Emilio
1957 *Últimas civilizaciones pre-históricas de la cuenca del río Guayas*. Publicación no. 2. Museo Víctor Emilio Estrada, Guayaquil. Reprinted by Archivo Histórico del Guayas, Guayaquil, 1979.

- Francisco, Alice Enderton
 1969 An Archaeological Sequence from Carchi, Ecuador. Ph.D. dissertation, Department of Anthropology, University of California, Berkeley. University Microfilms, Ann Arbor, Michigan.
- Gardner, Joan S.
 1979 Pre-Columbian Textiles from Ecuador: Conservation Procedures & Preliminary Study, *Technology & Conservation*, vol. 4, no. 1, spring, pp. 24–30. The Technology Organization, Boston.
- 1985 Pre-Columbian Textiles, Los Ríos Province, Ecuador, *National Geographic Society Research Reports*, vol. 18, grants in the year 1977. Edited by Winfield Swanson, pp. 327–342. Washington.
- González Suárez, Federico
 1908–10 *Los aborigenes de Imbabura y del Carchi: Investigaciones arqueológicas*, 2 vols. Tipografía y Encuadernación Salesiana, Quito.
- Grijalva, Carlos E.
 1937 *La expedición de Max Uhle a Cuasmal, o sea la protohistoria de Imbabura y Carchi*. Editorial Chimborazo, Quito.
- Hagino, Jane Parker and Karen E. Stothert
 1984 Weaving a Cotton Saddlebag on the Santa Elena Peninsula of Ecuador, *The Textile Museum Journal*, vol. 22, 1983, pp. 19–32. Washington.
- Harcourt, Raoul d'
 1962 *Textiles of Ancient Peru and their Techniques*. Edited by Grace G. Denny and Carolyn M. Osborne. Translated by Sadie Brown. University of Washington Press, Seattle.
- Jijón y Caamaño, Jacinto
 1920 Nueva contribución al conocimiento de los aborigenes de la provincia de Imbabura, *Boletín de la Sociedad Ecuatoriana de Estudios Históricos Americanos*, vol. 4, no. 10, enero-febrero, pp. 1–120 and vol. 4, no. 11, marzo-abril, pp. 183–244. Academia Nacional de Historia, Quito.
- Marcos, Jorge G.
 1979 Woven Textiles in a Late Valdivia Context (Ecuador), *The Junius B. Bird Pre-Columbian Textile Conference*. Edited by Ann Pollard Rowe, Elizabeth P. Benson, and Anne-Louise Schaffer, pp. 18–26. The Textile Museum and Dumbarton Oaks, Washington.
- Meisch, Lynn A.
 1987 *Otavalo: Weaving, Costume and the Market*. Ediciones Libri Mundi, Quito.
- Miller, George R. and Anne L. Gill
 1990 Zooarchaeology at Pirincay, a Formative Period Site in Highland Ecuador. *Journal of Field Archaeology*, vol. 17, no. 1, pp. 49–68. Association for Field Archaeology, Boston University.
- O'Neale, Lila M.
 1946 Mochica (Early Chimu) and Other Peruvian Twill Fabrics, *Southwestern Journal of Anthropology*, vol. 2, no. 3, autumn, pp. 269–294. University of New Mexico Press, Albuquerque.
- Plazas de Nieto, Clemencia
 1979 Orfebrería prehispánica del altiplano nariñense, Colombia, *Revista Colombiana de Antropología*, vol. 21, 1977–78, pp. 197–244. Instituto Colombiano de Cultura, Bogotá.
- Ravines, Rogger and Karen Stothert
 1978 Un entierro común del Horizonte Tardío en la costa central del Perú, *Revista del Museo Nacional*, tomo 42, pp. 153–173. Lima.
- Stahl, Peter W.
 1988 Prehistoric Camelids in the Lowlands of Western Ecuador. *Journal of Archaeological Science*, vol. 15, pp. 355–365. Academic Press, London.
- Stothert, Karen
 1979 Unwrapping an Inca Mummy Bundle, *Archaeology*, vol. 32, no. 4, July/August, pp. 8–17. Archaeological Institute of America, New York.
- n.d. An Analysis of Prehistoric Textile-Impressed Ceramic Sherds from Coastal Ecuador. *Ñawpa Pacha*. Institute of Andean Studies, Berkeley. In press.
- Stothert, Karen E., Kathleen A. Epstein, Thomas R. Cummins, and Maritza Freire
 1991 Reconstructing Prehistoric Textile and Ceramic Technology from Impressions of Cloth in Figurines from Ecuador, *Materials Issues in Art and Archaeology II*. Edited by Pamela B. Vandiver, James

Druzik, and George Segan Wheeler, pp. 767–776. Materials Research Society Symposium Proceedings, vol. 185, Pittsburgh.

Towle, Margaret

1961 *The Ethnobotany of Pre-Columbian Peru*. Viking Fund Publications in Anthropology, no. 30. Wenner-Gren Foundation for Anthropological Research, New York.

Ubelaker, D. H.

ms. Human Remains from La Florida, Quito, Ecuador (1991).

Vreeland, John M., Jr.

1986 Cotton Spinning and Processing on the Peruvian North Coast, *The Junius B. Bird Conference on Andean Textiles*, April 7th and 8th, 1984. Edited by Ann Pollard Rowe, pp. 363–383. The Textile Museum, Washington.

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